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Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) |
|---|---|---|
| | 10/645,988 | HUDSON, EDWIN LYLE |
| | Examiner | Art Unit |
| | Donna V. Lui | 2629 |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *10 July 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-26* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-26* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

## DETAILED ACTION

### *Specification*

1. The disclosure is objected to because of the following informality:

   a. Page 3, lines 21 and 24: Error in referencing to figures because figure 1D does not exist.

   Appropriate correction is required.

### *Information Disclosure Statement*

2. The listing of references in the specification is not a proper information disclosure statement. 37 CFR 1.98(b) requires a list of all patents, publications, or other information submitted for consideration by the Office, and MPEP § 609.04(a) states, "the list may not be incorporated into the specification but must be submitted in a separate paper." Therefore, unless the references have been cited by the examiner on form PTO-892, they have not been considered.

### *Claim Objections*

3. Claims 1, 6-7, 14, 19, and 25 are objected to because of the following informality: spelling and grammatical errors.

   Claim 1, lines 15-16: the limitation should read as "for inputting to ~~a~~ said microdisplay controller for controlling said voltages of said microdisplay device in response to"

   Claim 6, line 5: the limitation should read as "circuit chip ~~for~~ is disposed directly onboard of a silicon die of said"

Claim 7, line 4: The word sensor is misspelled.

Claim 14, lines 6-9: the limitation should read as "employing said voltage database to generate a temperature dependent reference ~~voltages~~ voltage for inputting to a multiplexer of a microdisplay controller for controlling a high and a low ~~voltages~~ voltage and ~~a~~ DC balancing of said LCD display system"

Claim 19, line 5: the limitation should read as "chip for ~~disposed~~ disposing directly onboard of a silicon die of a LCD"

Claim 25, line 3: the limitation should read as "circuit chip for ~~disposed~~ disposing directly onboard of a silicon die of a LCD"

Appropriate correction is required.

## *Claim Rejections - 35 USC § 103*

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. **Claims 1, 3-4, 6, and 9** are rejected under 35 U.S.C. 103(a) as being unpatentable over Lippmannn et al. (Patent No.: 5,936,603) in view of Iijima et al. (Patent No.: US 6,930,667 B1).

With respect to **Claim 1**, Lippmann discloses a liquid crystal display (LCD) system *(See figure 1, element 22)* implemented with a thermal control and management system *(See figure 4)* comprising a temperature sensor system *(element 94, column 4, lines 57-60)* disposed directly

onboard of a LCD microdisplay device for directly measuring a temperature of the microdisplay device *(column 2, lines 6-9)* and generating a temperature measurement signal *(column 4, line 64 to column 5, line 4)*; a microdisplay controller *(element 82: control logic circuit is equivalent to a microdisplay controller)* for controlling voltages of the microdisplay device and receiving the temperature signal for transmitting a digital signal *(column 3, lines 41-43)* to a system processor *(column 5, lines 12-21)*; and the system processor processing the digital signal corresponding to the temperature of the microdisplay device to generate temperature-dependent reference signals for inputting to the microdisplay controller for controlling the voltages of the microdisplay device in response to temperature measurement signal *(column 5, lines 12-21; note that the temperature compensation circuit of figure 4 is comprised of the control logic circuit, thus the generated temperature-dependent reference signals are inputted to the microdisplay controller in response to the temperature measurement signal)*.

Lippmann does not mention the temperature sensor system is disposed directly onboard of a silicon die of a LCD microdisplay device.

Iijima teaches a temperature sensor system disposed directly onboard of a liquid crystal panel *(column 7, lines 19-23)* formed together with the driving circuit on a silicon substrate *(column 5, lines 44-47)*.

It would have been obvious for a person of ordinary skill in the art at the time the invention was made to have a temperature sensor system disposed directly onboard of a silicon die of a LCD microdisplay device, as taught by Iijima in the liquid crystal display system of Lippmann, so as to provide better temperature sensing and therefore more accurate controlling of the voltage which results in better quality images such that flicker does not occur and the

brightness does not vary *(Iijima: column 10, line 54 to column 11, line7; note that since the temperature sensor system is disposed directly onboard of a LCD device, better temperature sensing is provided because at low temperatures the frame frequency is set low and at high temperatures the frame frequency is set to a high frequency).*

With respect to **<u>Claim 3</u>**, the LCD system of claim 1, Lippmann teaches the microdisplay controller further includes a control register *(figure 4, element 86; column 5, lines 15-21)* for loading and reading the temperature measurement signal as a digital word *(column 5, lines 42-43).*

With respect to **<u>Claim 4</u>**, the LCD system of claim 3, Lippmann teaches the microdisplay controller further includes a digital-to-analog converter (DAC) *(See figure 4, element 88; column 5, lines 5-21)* for converting the temperature dependent signals received from the temperature sensor system *(element 94)* as temperature dependent voltages.

With respect to **<u>Claim 6</u>**, the modified LCD system of Lippmann by Iijima in claim 1 teaches the temperature sensor system further integrated as an integrated circuit chip is disposed directly onboard of a silicon die of the microdisplay device *(Lippmann: element 94, column 4, lines 57-60) (column 3, lines 24-25).*

With respect to **<u>Claim 9</u>**, the LCD system of claim 1, Lippmann teaches the system processor further determining if the temperature measurement signal is within a predefined range *(column 5, lines 22-26 and lines 47-51).*

6. **<u>Claims 14-17 and 20-23</u>** are rejected under 35 U.S.C. 103(a) as being unpatentable over Lippman in view of Wood et al. (Patent Number: 5,926,162).

With respect to **<u>Claim 14</u>**, Lippman teaches a thermal control and management system *(See figure 4)* having a voltage database *(memory comprising: 136: column 5,lines 47-49; 130: column 5, lines 39-42; and 132: column 5, lines 42-44)* for receiving and processing a microdisplay temperature measurement signal for the LCD system *(column 2, lines 6-9)* by employing the voltage database to generate a temperature dependent reference voltage, a multiplexer *(element 80)*, and a microdisplay controller *(element 82: control logic circuit is equivalent to a microdisplay controller).*

Lippman does not mention employing the voltage database for inputting to multiplexer of a microdisplay controller for controlling a high and a low voltage and DC balancing of the LCD display system.

Wood teaches a LCD display system *(See figure 1, element 100; column 3, lines 22-23)* and a common electrode control circuit *(See figure 4, element 110 is equivalent to a microdisplay controller; column 5, lines 49-50)* for controlling a high and a low voltage and DC balancing of the LCD display system *(column 5, line 65 to column 6, line 16; note that a maximum voltage is equivalent to a high voltage and a minimum voltage is equivalent to a low voltage; column 38-*

*48; note that determining the null component of the common plane voltage is equivalent to DC balancing of the LCD).*

It would have been obvious for a person of ordinary skill in the art at the time the invention was made to control a high and a low voltage and DC balance a LCD display system, as taught by Wood, in the IC driver *(Lippmann: See figure 1, element 16; Wood: column 6, lines 17-22)* of the thermal control and management system of Lippman by employing the voltage database of Lippmann to generate a temperature-dependent reference voltage for inputting to the multiplexer for controlling a high and a low voltage and a DC balanced LCD display system so as to reduce the chance for a long-term image retention, and improves the performance of the LCD over temperature so that the life of the LCD may be prolonged *(Wood: column 10, lines 12-15).*

With respect to **Claim 20**, Lippmann teaches a method for temperature control and compensation for a microdisplay system *(See figure 4)* comprising: receiving and processing a microdisplay temperature measurement signal from the microdisplay system *(column 2, lines 6-9)* by employing a voltage database *(memory comprising: 136: column 5,lines 47-49; 130: column 5, lines 39-42; and 132: column 5, lines 42-44)* to generate a temperature-dependent reference voltage, a multiplexer *(See figure 4, element 80)*, and a microdisplay controller *(element 82: control logic circuit is equivalent to a microdisplay controller)* for controlling voltages of the microdisplay system in response to the temperature measurement signal *(column 5, lines 12-21; note that the temperature compensation circuit of figure 4 is comprised of the*

*control logic circuit, thus the generated temperature-dependent reference signals are inputted to the microdisplay controller in response to the temperature measurement signal).*

Lippmann does not mention inputting the temperature-dependent reference voltages into a multiplexer of a microdisplay DC-balancing controller for controlling voltages of the microdisplay system in response to the temperature measurement signal.

Wood teaches a LCD display system *(See figure 1, element 100; column 3, lines 22-23)* and a common electrode control circuit *(See figure 4, element 110 is equivalent to a microdisplay controller; column 5, lines 49-50)* for controlling a high and a low voltage and DC balancing of the LCD display system *(column 5, line 65 to column 6, line 16; note that a maximum voltage is equivalent to a high voltage and a minimum voltage is equivalent to a low voltage; column 38-48; note that determining the null component of the common plane voltage is equivalent to DC balancing of the LCD).*

It would have been obvious for a person of ordinary skill in the art at the time the invention was made to have a method of controlling a high and a low voltage and DC balancing a LCD display system, as taught by Wood, in the IC driver *(Lippmann: See figure 1, element 16; Wood: column 6, lines 17-22)* of the thermal control and management system of Lippman by inputting the temperature-dependent reference voltages into a multiplexer of a microdisplay controller such that the voltages are DC-balanced in response to the temperature measurement signal, resulting in a microdisplay DC-balancing controller, so as to reduce the chance for a long-term image retention, and improves the performance of the LCD over temperature so that the life of the LCD may be prolonged *(Wood: column 10, lines 12-15).*

With respect to **Claim 15**, the liquid crystal display (LCD) system of claim 14, Lippmann does not teach the microdisplay controller further generating a temperature-dependent black state voltage and a white state voltage as the temperature-dependent reference voltages in response to the temperature measurement signal and DC balancing.

Wood teaches a controller *(controller: common electrode control circuit; column 2, lines 48-51)* further generating a temperature-dependent black state voltage and a white state voltage as the temperature-dependent reference voltages in response to the temperature measurement signal and DC balancing *(See figure 4; column 5, lines 54-56; column 5, line 65 to column 6, line 16; note that a black state voltage is equivalent to driving a normally black pixel to white and a white state voltage is equivalent to driving a normally white pixel to black; column 38-48; note that determining the null component of the common plane voltage is equivalent to DC balancing of the LCD)*.

It would have been obvious for a person of ordinary skill in the art at the time the invention was made to have a controller further generating a temperature-dependent black state voltage and a white state voltage as the temperature-dependent reference voltages in response to the temperature measurement signal and DC balancing, as taught by Wood, to the LCD system of Lippmann, so as to reduce the chance for a long-term image retention and improve the performance of the LCD over temperature so that the life of the LCD may be prolonged *(Lippmann: column 10, lines 12-15)*.

With respect to **<u>Claim 16</u>**, the liquid crystal display (LCD) system of claim 15 wherein: the microdisplay controller further includes a control register *(figure 4, element 86; column 5, lines 15-21)* for loading and reading the temperature measurement signal.

With respect to **<u>Claim 17</u>**, the liquid crystal (LCD) system of claim 15, Lippmann teaches the system processor further includes DAC output circuits *(See figure 4, element 88; column 5, lines 5-21) (column 4, lines 28-29 and lines 49-55)* for outputting the temperature dependent reference voltages.

With respect to **<u>Claim 21</u>**, the method of claim 20 further comprising, Lippmann teaches the step of generating the temperature-dependent reference voltages *(column 5,lines 47-49; 130: column 5, lines 39-42; and 132: column 5, lines 42-44)* and a multiplexer *(See figure 4, element 80)* but does not mention the step further comprising a step of multiplexing and generating a temperature-dependent black state voltage and a white state voltage according to a DC balancing state for controlling voltages of the microdisplay system in response to the temperature measurement signal.

Wood teaches a LCD display system *(See figure 1, element 100; column 3, lines 22-23)* and generating a temperature-dependent black state voltage and a white state voltage *(See figure 4; column 5, lines 54-56; column 5, line 65 to column 6, line 16; note that a black state voltage is equivalent to driving a normally black pixel to white and a white state voltage is equivalent to driving a normally white pixel to black)* according to a DC balancing state for controlling voltages of the microdisplay system in response to the temperature measurement signal *(column*

*38-48; note that determining the null component of the common plane voltage is equivalent to DC balancing of the LCD).*

It would have been obvious for a person of ordinary skill in the art at the time the invention was made to have the step of generating temperature-dependent reference voltages to further comprise a step of generating a temperature-dependent black state voltage and a white state voltage according to a DC balancing state for controlling voltages of the microdisplay system in response to the temperature measurement signal, as taught by Wood, to the method for temperature control and compensation of Lippmann, so as to reduce the chance for a long-term image retention, and improves the performance of the LCD over temperature so that the life of the LCD may be prolonged *(Wood: column 10, lines 12-15).*

With respect to **Claim 22**, the method of claim 20, Lippmann teaches the step of receiving and processing the temperature measurement signal from the microdisplay further includes a step of receiving the temperature measurement signal into a system processor having a control register *(figure 4, element 86; column 5, lines 15-21)* for loading and reading the temperature measurement signal.

With respect to **Claim 23**, the method of claim 20, Lippmann teaches the step of generating the temperature-dependent reference voltages further comprising a step of outputting the temperature-dependent reference voltages through DAC output circuits *(See figure 4, element 88; column 5, lines 5-21)* to the multiplexer *(element 80).*

7. **Claims 2, 11, and 12** are rejected under 35 U.S.C. 103(a) as being unpatentable over Lippmann and Iijima as applied to claim 1 above, and further in view of Wood.

With respect to **Claim 2**, the LCD system of claim 1, Lippman and Iijima do not mention the system processor inputting the temperature dependent reference signals into a multiplexer of the microdisplay controller for generating a temperature-dependent black state voltage and a white state voltage for controlling the voltages of the microdisplay device in response to the temperature measurement signal.

Wood teaches a controller *(controller: common electrode control circuit; column 2, lines 48-51)* for generating a temperature-dependent black state voltage and a white state voltage for controlling the voltages of the microdisplay device in response to the temperature measurement signal *(See figure 4; column 5, lines 54-56; column 5, line 65 to column 6, line 16; note that a black state voltage is equivalent to driving a normally black pixel to white and a white state voltage is equivalent to driving a normally white pixel to black)*.

It would have been obvious for a person of ordinary skill in the art at the time the invention was made to have a controller for generating temperature-dependent black state voltage and a white state voltage for controlling the voltages of the microdisplay device in response to the temperature measurement signal, as taught by Wood, to the LCD system of Lippmann as modified by Iijima, so as to reduce the chance for a long-term image retention and improve the performance of the LCD over temperature so that the life of the LCD may be prolonged *(Lippmann: column 10, lines 12-15)*.

With respect to **Claim 11**, the LCD system of claim 1, Lippmann and Iijima do not mention the microdisplay controller controlling the voltages of the microdisplay device in response to the temperature measurement signal for operating the LCD microdisplay device as a liquid crystal display device of a normally white mode device.

Wood teaches a controller *(controller: common electrode control circuit; column 2, lines 48-51)* controlling the voltages of the microdisplay device in response to the temperature measurement signal for operating the LCD microdisplay device as a liquid crystal display device of a normally white mode device *(See figure 4; column 5, lines 54-56; column 5, line 65 to column 6, line 16; note that a normally white mode is equivalent to driving a normally white pixel to black)*.

It would have been obvious for a person of ordinary skill in the art at the time the invention was made to have a controller controlling the voltages of the microdisplay device in response to the temperature measurement signal for operating the LCD microdisplay device as a liquid crystal display device of a normally white mode device, as taught by Wood, to the LCD system of Lippmann as modified by Iijima, so as to reduce the chance for a long-term image retention and improve the performance of the LCD over temperature so that the life of the LCD may be prolonged *(Lippmann: column 10, lines 12-15)*.

With respect to **Claim 12**, the LCD system of claim 1, Lippmann and Iijima do not mention the microdisplay controller controlling the voltages of the microdisplay device in response to the temperature measurement signal for operating the LCD microdisplay device as a liquid crystal display device of a normally black mode device.

Wood teaches a controller *(controller: common electrode control circuit; column 2, lines 48-51)* controlling the voltages of the microdisplay device in response to the temperature measurement signal for operating the LCD microdisplay device as a liquid crystal display device of a normally black mode device *(See figure 4; column 5, lines 54-56; column 5, line 65 to column 6, line 16; note that a normally black mode is equivalent to driving a normally black pixel to white)*.

It would have been obvious for a person of ordinary skill in the art at the time the invention was made to have a controller controlling the voltages of the microdisplay device in response to the temperature measurement signal for operating the LCD microdisplay device as a liquid crystal display device of a normally black mode device, as taught by Wood, to the LCD system of Lippmann as modified by Iijima, so as to reduce the chance for a long-term image retention and improve the performance of the LCD over temperature so that the life of the LCD may be prolonged *(Lippmann: column 10, lines 12-15)*.

8. **Claim 5** is rejected under 35 U.S.C. 103(a) as being unpatentable over Lippmann and Iijima as applied to claim 1 above, and further in view of Yasue (Patent No.: US 6,806,871 B1).

With respect to **Claim 5**, the LCD system of claim 1, Lippmann and Iijima do not mention the system processor further interpolating between two data in a database for generating the temperature dependent reference signals for inputting to the microdisplay controller.

Yasue teaches interpolating between two data in a database for generating the temperature dependent reference signals *(column 8, lines 26-32)* for inputting to a controller.

It would have been obvious for a person of ordinary skill in the art at the time the invention was made to have the LCD system of Lippmann as modified by Iijima and to further modify the system by Yasue such that a system processor further interpolates between data in a database for generating the temperature dependent reference signals for inputting to the microdisplay controller, so as to provide a low temperature area, a room-temperature area, and a high temperature area with different temperature gradients and to apply voltage compensation conforming with the temperature dependence of an electro-optical element *(column 2, lines 20-27)*.

9. **Claim 7** is rejected under 35 U.S.C. 103(a) as being unpatentable over Lippmann and Iijima in view of the 10$^{th}$ Mediterranean Electrotechnical Conference, MeleCon 2000, Vol. II (PTAT Sensors Based on SJFETs, herein after referred to as "MEC").

With respect to **Claim 7**, the LCD system of claim 1, Lippmannn teaches the use of a temperature sensor system comprising an NPN silicon transistor having its collector connected through a resistor to VDD and its emitter connected through a resistor to ground and the base is connected through divider resistors and VDD *(column 4, lines 57-63)*. Lippmann and Iijima do not teach the temperature sensor system further comprising a PTAT temperature sensor system.

MEC teaches the use of PTAT sensors.

It would have been obvious for a person of ordinary skill in the art at the time the invention was made to substitute the PTAT sensor, as taught by MEC into the LCD system of Lippmann as modified by Iijima, so as to obtain good sensitivity, stability and linearity of sensor

response in the measured temperature range of 20-90 degrees Celsius *(page 1, $2^{nd}$ column, $2^{nd}$ paragraph)*.

10. **Claim 8** is rejected under 35 U.S.C. 103(a) as being unpatentable over Lippmann and Iijima in view of Applicant Admitted Prior Art (herein after referred to as "AAPA").

With respect to **Claim 8**, the LCD system of claim 1, Lippmann and Iijima do not teach the system process further includes an additional cooling activating system to activate additional cooling for the LCD microdisplay device in response to the temperature measurement signal.

The AAPA teaches the use of a thermostat for activating a fan in a microdisplay *(page 1, [0009], lines 6-10)*. It would have been obvious for a person of ordinary skill in the art at the time the invention was made to activate a fan in a microdisplay for cooling in response to a temperature measurement signal, as taught by the AAPA, to the LCD system of Lippmann as modified by Iijima, so as to control the operational temperature of a microdisplay *(page 1, [0009], lines 6-7)*.

11. **Claim 10** is rejected under 35 U.S.C. 103(a) as being unpatentable over Lippmann and Iijima in view of Levy et al. (Patent No.: 3,936,817).

With respect to **Claim 10**, the LCD system of claim 1, Lippmann and Iijima do not mention the system processor further receiving and processing the temperature measurement signal to function as a part of a Peltier thermal control loop.

Levy teaches the use of a Peltier thermal control loop *(column 3, lines 29-37; A Peltier thermal control loop is equivalent to the thermoelectric effects/element, column 3, lines 43-45).*

It would have been obvious for a person of ordinary skill in the art at the time the invention was made to use the Peltier thermal control loop, as taught by Levy, to the LCD system of Lippmann as modified by Iijima so as to function as a heat absorbing or generating system in order to conduct heat flow to or away from a heat sink *(column 5, lines 5-18).*

12. **Claim 13** is rejected under 35 U.S.C. 103(a) as being unpatentable over Lippmann and Iijima in view of Waterman et al. (Patent No.: 6,744,415).

With respect to **Claim 13**, the LCD system of claim 4, Lippmann and Iijima do not mention the DAC further comprising a resistor digital to analog converter (RDAC).

Waterman teaches the DAC as a resistor digital to analog converter *(column 7, lines 3-5; the RDAC is equivalent to a DAC according to the R-2R principle).*

It would have been obvious for a person of ordinary skill in the art at the time the invention was made to use a resistor digital to analog converter, as taught by Waterman to the LCD system of Lippmann as modified by Iijima, so as to obtain an ideal integration because the resistor network can be realized very precisely using the matching principle *(column 7, lines 10-12)*, providing a control voltage for driving the liquid crystal display *(column 2, lines 26-27)* and, providing optimum resolution within a voltage range in which most of the gray changes on the LCD occur *(column 2, lines 36-37).*

13. **Claims 18 and 24** are rejected under 35 U.S.C. 103(a) as being unpatentable over Lippmann and Wood as applied to claims 14, 15 and 20 above, and further in view of Yasue.

With respect to **Claim 18**, the liquid crystal display (LCD) system of claim 15, Lippman and Wood do not mention the system processor further interpolating between two data in the database for generating the temperature dependent reference voltages.

Yasue teaches interpolating between two data in a database for generating temperature dependent reference voltages *(column 8, lines 26-32).*

It would have been obvious for a person of ordinary skill in the art at the time the invention was made to interpolate between two data in a database for generating temperature dependent reference voltages, as taught by Yasue to the LCD system of Lippmann as modified by Wood, so as to provide a low temperature area, a room-temperature area, and a high temperature area with different temperature gradients and to apply voltage compensation conforming with the temperature dependence of an electro-optical element *(column 2, lines 20-27).*

With respect to **Claim 24**, claim 24 differs from claim 18 only in that claim 24 is a method claim whereas claim 18 is a system claim. Thus, claim 24 is analyzed as previously discussed with respect to claim 18.

14. **Claims 19 and 25** are rejected under 35 U.S.C. 103(a) as being unpatentable over Lippmann and Wood as applied to claim 14 above, and further in view of Iijima.

With respect to **<u>Claim 19</u>**, the liquid crystal display (LCD) system of claim 14, Lippmann and Wood teach the temperature sensor system further integrated as an integrated circuit chip for disposing directly onboard of a LCD microdisplay device in the LCD system, but do not teach disposing directly onboard of a silicon die of a LCD microdisplay device.

Iijima teaches a temperature sensor system disposed directly onboard of a liquid crystal panel *(column 7, lines 19-23)* formed together with the driving circuit on a silicon substrate *(column 5, lines 44-47)*.

It would have been obvious for a person of ordinary skill in the art at the time the invention was made to have a temperature sensor system further integrated as an integrated circuit chip for disposing directly onboard of a silicon die of a LCD microdisplay device, as taught by Iijima in the liquid crystal display system of Lippmann as modified by Wood, so as to provide better temperature sensing and therefore more accurate controlling of the voltage which results in better quality images such that flicker does not occur and the brightness does not vary *(Iijima: column 10, line 54 to column 11, line7; note that since the temperature sensor system is disposed directly onboard of a LCD device, better temperature sensing is provided because at low temperatures the frame frequency is set low and at high temperatures the frame frequency is set to a high frequency).*

With respect to **<u>Claim 25</u>**, claim 25 differs from claim 19 only in that claim 25 is a method claim whereas claim 19 is a system claim. Thus, claim 25 is analyzed as previously discussed with respect to claim 19.

15. **<u>Claim 26</u>** is rejected under 35 U.S.C. 103(a) as being unpatentable over Lippmann and Wood as applied to claim 20 above, and further in view of Yasue.

With respect to **<u>Claim 26</u>**, the method of claim 20, Lippman and Wood a step of employing the voltage database for generating the temperature-dependent reference voltages but do not teach the step further comprising a step of applying the temperature measurement signal for carrying out a curve-fitting algorithm using data in the database for generating the temperature-dependent reference voltages.

Yasue teaches a step of applying the temperature measurement signal for carrying out a curve-fitting algorithm using data in the database for generating the temperature-dependent reference voltages *(column 8, lines 26-32)*.

It would have been obvious for a person of ordinary skill in the art at the time the invention was made to have a step of applying the temperature measurement signal for carrying out a curve-fitting algorithm using data in the database for generating the temperature-dependent reference voltages, as taught by Yasue, to the method for temperature control and compensation of Lippmann as modified by Wood so as to provide a low temperature area, a room-temperature area, and a high temperature area with different temperature gradients, and to implement applied

voltage compensation conforming with the temperature dependence of an electro-optical element *(Yasue: column 2, lines 20-27).*

***Response to Arguments***

16. Applicant's arguments with respect to claims 1-26 have been considered but are moot in view of the new ground(s) of rejection.

***Conclusion***

17. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Donna V. Lui whose telephone number is (571) 272-4920. The examiner can normally be reached on Monday through Friday 8:30 a.m. - 5:00 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amr Awad can be reached on (571)272-7764. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Donna V Lui
Examiner
Art Unit 2629

AMR A. AWAD
SUPERVISORY PATENT EXAMINER

Amr Ahmed Awad